

IN THE CLAIMS:

Cancel claims 10, 14, 16, 20, 22, 24, 26, 28 and 30.

Amend claims 9, 12, 15, 17, 18, 19, 21, 25 and 35 by deleting the language in brackets and adding the underlined language, as follows:

D 9. (Amended twice) A polypeptide analog of [the] *Bordetella pertussis* ~~exotoxin~~ S1 subunit, said analog differing in amino acid sequence from that of [the] naturally occurring S1 subunit by [the] substitution of [one or more] a different amino acid [residues in the region bounded by valine 7 and proline 14, inclusively] residue at arginine 9, wherein the analog has a biological activity which (a) can elicit toxin neutralizing-levels of antibodies and (b) is substantially free of enzymatic activities associated with ~~exotoxin~~ reactogenicity.

C 22 12. (Amended twice) The analog of claim 9 wherein said biological activity of (b) is obtained by site-specific mutagenesis resulting in said analog being substantially inactive enzymatically.

C 34 15. (Amended once) The analog of claim [14] 9 wherein arginine 9 is replaced with lysine.

5 17. (Amended twice) The analog of claim 9 which includes [a] an amino-terminus methionylvalyl sequence [at the amino-terminus].

C 18. (Amended twice) An analog of *Bordetella pertussis* ~~exotoxin~~ subunit S1, said analog comprising [the] an amino acid sequence [of] as depicted in Figure 7 (SEQ ID NO: 27), said analog having a biological activity which (a) can elicit toxin-neutralizing levels of antibodies and (b) is substantially free of enzymatic activities associated with ~~exotoxin~~ reactogenicity.

*C4* 19. (Amended twice) [An improved] A vaccine against pertussis comprising a modified *Bordetella pertussis* exotoxin [composed of genetically-engineered polypeptide analog of subunit S1 in combination with subunits S2, S3, S4 and S5, said S1 analog differing in amino acid sequence from that of the naturally occurring S1 subunit by the substitution of one or more] in which a different amino acid [residues in the region bounded by valine 7 and proline 14, inclusively] residue has been substituted for arginine 9 in subunit S1, wherein the [analog] modified *Bordetella pertussis* exotoxin has a biological activity which (a) can elicit toxin-neutralizing levels of antibodies and (b) is substantially free of enzymatic activities associated with exotoxin reactogenicity.

*C5* 21. (Amended once) The [improved] vaccine of claim [21] 19 wherein said toxin-neutralizing levels of antibodies provide immunoprotection against *Bordetella* toxicity.

*C6* 25. (Amended once) The [improved] vaccine of claim [24] 19 wherein arginine 9 is replaced with lysine.

*C10* 35. (Amended once) [An improved] A vaccine against pertussis comprising a polypeptide analog of *Bordetella pertussis* exotoxin subunit S1 [, said analog comprising [the] an amino acid sequence [of] as depicted in Figure 7 (SEQ ID NO: 27), said analog having a biological activity which (a) can elicit toxin neutralizing levels of antibodies [; and (b) is substantially free of enzymatic activities associated with exotoxin reactogenicity.